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A Method for Reasoning About an Acquisition Strategy

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Report Documentation Page

1. REPORT DATE **JAN 2005**	2. REPORT TYPE	3. DATES COVERED **00-00-2005 to 00-00-2005**
4. TITLE AND SUBTITLE **A Method for Reasoning About an Acquisition Strategy**		5a. CONTRACT NUMBER
		5b. GRANT NUMBER
		5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)		5d. PROJECT NUMBER
		5e. TASK NUMBER
		5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Carnegie Mellon University,Software Engineering Institute,Pittsburgh,PA,15213**		8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)
12. DISTRIBUTION/AVAILABILITY STATEMENT **Approved for public release; distribution unlimited**		
13. SUPPLEMENTARY NOTES		
14. ABSTRACT		
15. SUBJECT TERMS		

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT **Same as Report (SAR)**	18. NUMBER OF PAGES **23**	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**			

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Acquisition Process

Transforms a "Need" into a "Product"

Complex process in a challenging environment

Success requires careful planning and diligent execution

- **Planning starts with the development of an ACQUISITION STRATEGY**
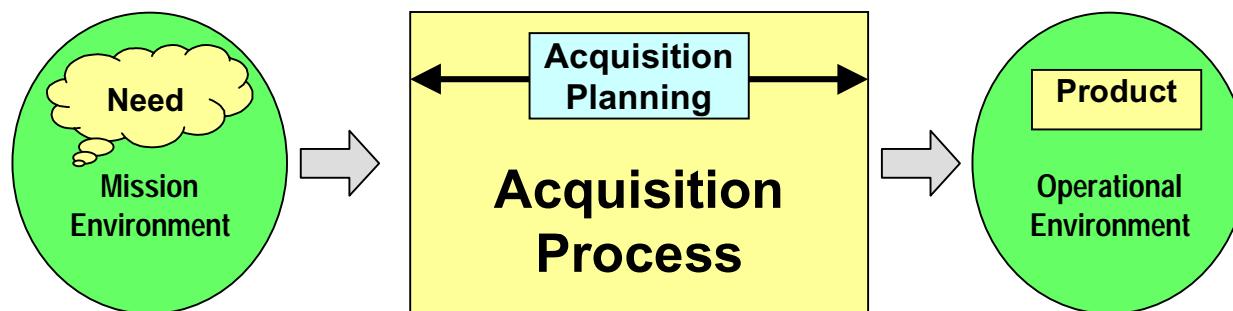
Research Focus

Key problems with acquisition strategy development

- Disassociated from its foundation: risk reduction
- Unique nature of software risks not always considered in larger acquisition strategy

Research focus

- Support a more systematic approach to reasoning about software risk on a program
  - Drivers
 - Strategy Elements

Acquisition Strategy
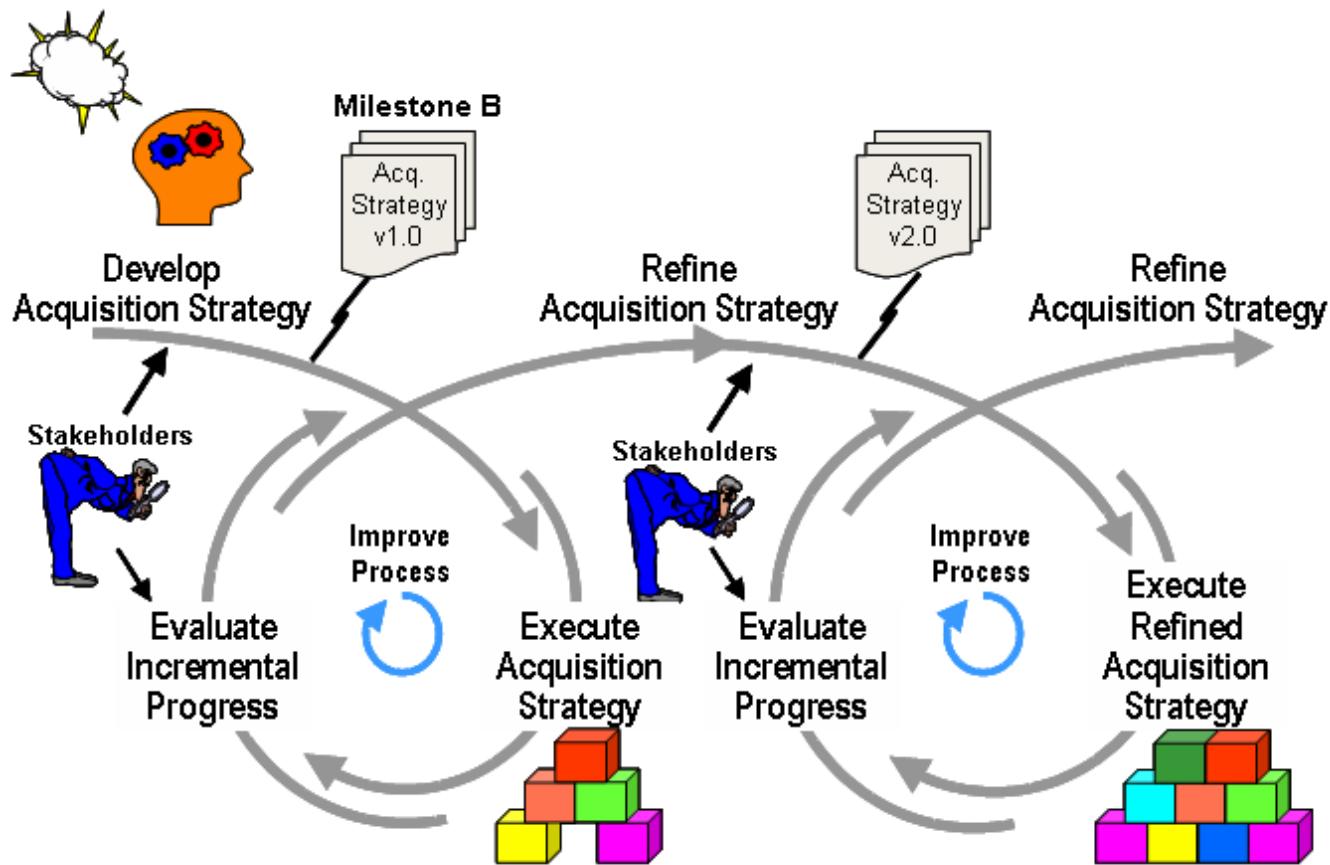
A Systems Engineering Approach to Acquisition Strategy Development

- Define the objectives of the acquisition strategy

- Decompose the strategy into individual strategy elements

- Identify and evaluate the factors that drive strategic choices for each strategy element

- Choose strategies for each element that best address the driving factors

- Integrate the strategy elements into a coherent acquisition strategy
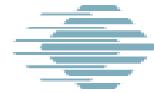
Acquisition Strategy Objective

… Risk Mitigation !

PROGRAM

Program Drivers

Internal Drivers

External Drivers

R I S K

Acquisition Strategy

(Mitigation of <u>Major</u> Risks)

RISK

Other Program Risk Management and Risk Mitigation Processes

Acquisition Plan

Source Selection Plan

Program Plan

Solicitation Package

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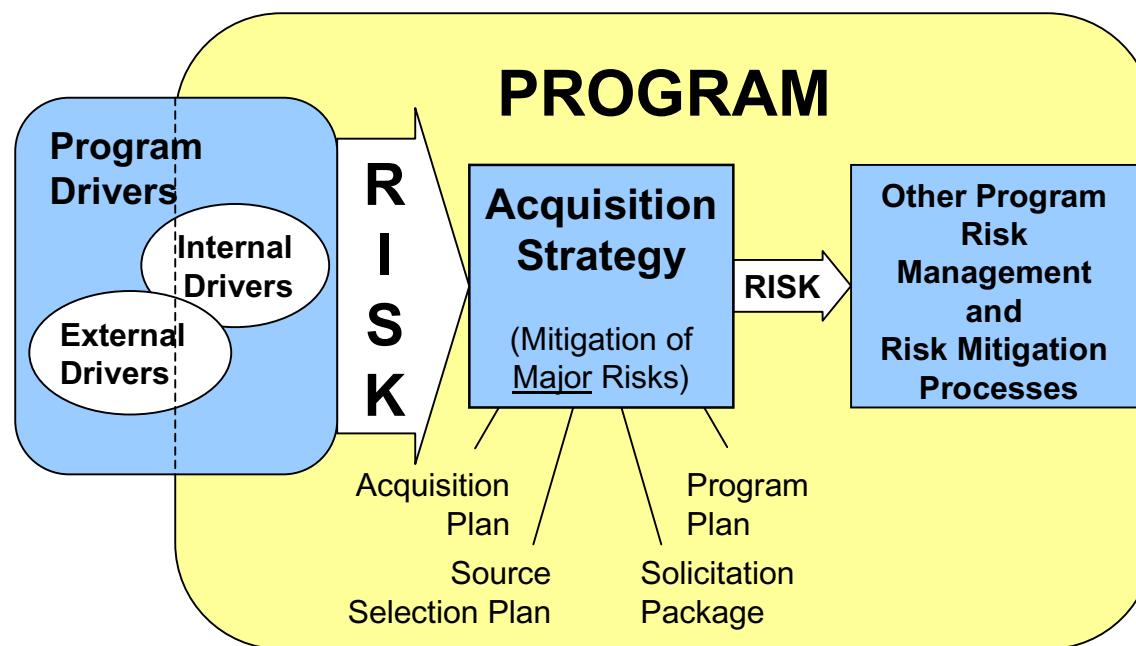
Strategy Elements*

Program Structure

Acquisition Approach

Business Considerations
- Competition
- Solicitation Type
- Source Selection
- Contract Approach

Risk Management

**Test and Evaluation**

Product Support

* Partial list
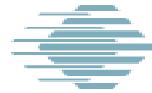
Strategy Elements 2

Strategy Element	Strategic Choices
Acquisition Approach	• Single step • Evolutionary – incremental • Evolutionary - Spiral
Business Considerations: *Competition*	• Full and Open • Full and Open After Exclusion of Sources • Sole Source Contracting
Business Considerations: *Solicitation*	• Invitation for Bid (IFB) • Request for Proposal (RFP) with SOW • Request for Proposal (RFP) with SOO • Request for Quotation (RFQ) • Request for Information (RFI)

Strategy Elements [3]

| Strategy Element	Strategic Choices
Business Considerations: *Contract Approach*	• **Fixed-Price (FP) Contracts** 　• Firm FP 　• FP with Economic Price Adjustment 　• FP / Prospective Price Redetermination 　• Fixed-Ceiling-Price with Retroactive Price Redetermination 　• Firm FP, Level-of-Effort Term • **Cost Contracts** 　• Cost Contract 　• Cost-Sharing Contract 　• Cost-Plus-Fixed-Fee Contract • **Incentive Contracts** 　• Fixed-Price Incentive Contract 　• Fixed-Price Contract With Award Fees 　• Cost-Plus-Incentive-Fee Contract 　• Cost-Plus-Award-Fee Contract

Strategy Elements 4

Strategy Element	Strategic Choices
Training	• Self-Training • Computer-Based Training • Distance Learning • Classroom Training • Field Training
Product Support: *Source of Support*	• Contractor Logistics Support • PMO Support • Depot Support • Organic Support
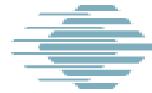
Ranking Strategic Choices

For each strategy element, rank the strategic choices
per their ability to mitigate risk

ACQUISITION METHOD STRATEGY ELEMENT

STRATEGIES
1	Evolutionary - spiral
2	Evolutionary - incremental
3	Single Step

INCREASING RISK
MITIGATION CAPABILITY
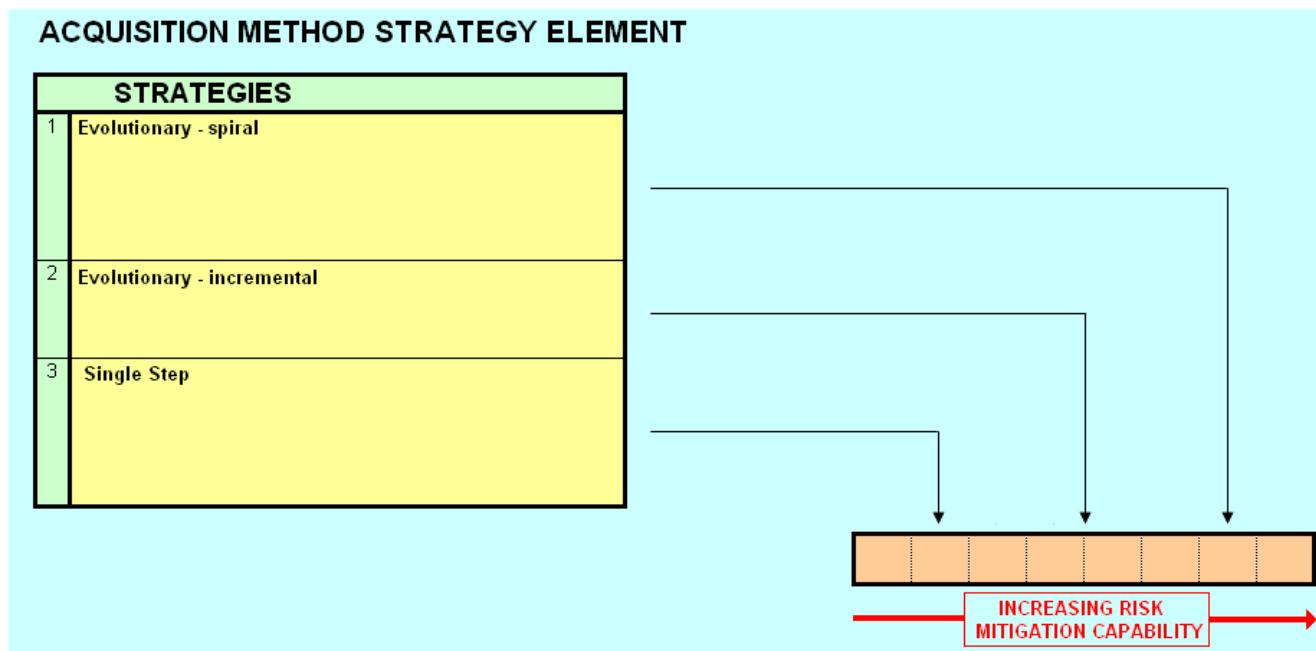
Acquisition Strategy Drivers

Software Criticality Category	Acquisition Environment Category	Program-matic Category	Organiza-tional Category	Life Cycle Category
Software Criticality	Policies and Mandates	Mission Needs and Scope	PMO Capability	Product Definition & Specification
	Supplier Availability	Funding	Stakeholders	Architecture and Design
		Schedule	Supplier Capability	Verification and Test
				Deployment
				Maintenance and Support
				Disposal
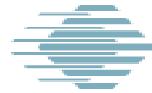
Strategy Drivers 1

| Driver Category	Strategy Driver
Software Criticality	• **Magnitude of Software** • **Reliance on software**

Acquisition Environment	• **Policies and Mandates**
	  • *Conflict among mandates*
	  • *Conflict with project objectives*
	• **Supplier Availability**

Programmatic	• **Mission Needs and Scope**
	  • *Definition*
	  • *Flexibility*
	• **Funding**
	  • *Funding Constraints*
	  • *Funding Profile*
	• **Schedule**
	  • *Schedule Constraints*
	  • *Urgency*
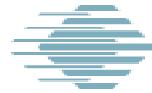
Strategy Drivers 2

Driver Category	Strategy Driver

Organizational	• **Program Management Office capabilities**
	   • *PMO Staff Skills*
	   • *PMO Staff Capacity*
	   • *PMO Staff Stability*
	   • *PMO Process Focus*
	 • **Stakeholders**
	   • *Number and Diversity*
	   • *Level of Engagement (responsiveness and quality)*
	   • *Level of Agreement*
	 • **Supplier Capability**
	   • *Supplier Staff Skills*
	   • *Supplier Staff Capacity*
	   • *Supplier Staff Stability*
	   • *Supplier Performance to Date*
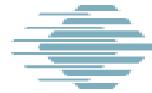
Strategy Drivers [3]

| Driver Category	Strategy Driver
Life-cycle: *Product Definition and Specification*	• Requirements Volatility • Requirements Understanding • Quality Attribute Definitions • Interoperability
Life-cycle: *Architecture and Design*	• Precedence • Quality Attribute Constraints • Technology Readiness • Legacy Considerations • COTS / GOTS / Reuse
Life-cycle: *Verification and Test*	• Test Environment Complexity • Test Environment Availability • Number of System Configurations
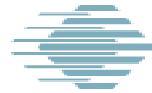
Strategy Drivers 4

Driver Category	Strategy Driver
Life-cycle: *Deployment*	• Number of Sites • User Readiness • Maintainer Readiness • Transition / Data Migration
Life-cycle: *Maintenance and Support*	• Number of System Configurations • Update Readiness • Support Duration • Re-competition Readiness • Operational Environment • Legacy Considerations • Availability of Data Rights
Life-cycle: *Disposal*	• Security • Archiving

Driver Evaluation using Slider Bars
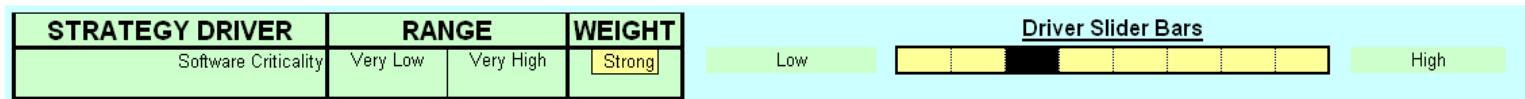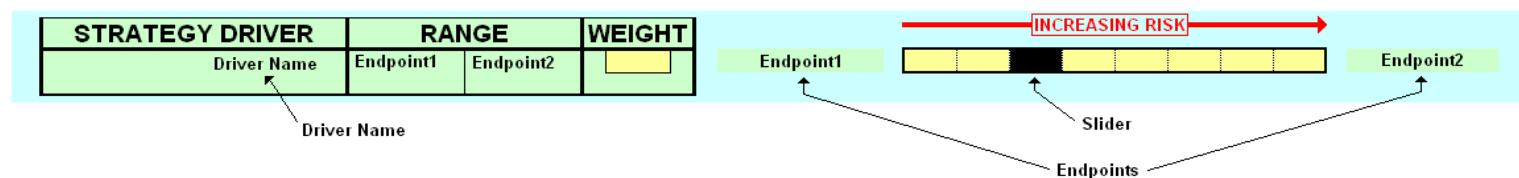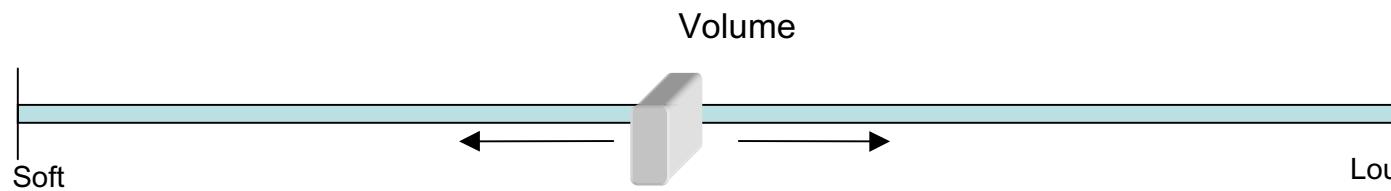
Volume

Soft ←→ Loud

STRATEGY DRIVER	RANGE		WEIGHT
Driver Name	Endpoint1	Endpoint2	

Driver Name

INCREASING RISK →

Endpoint1   Endpoint2

Slider

Endpoints

STRATEGY DRIVER	RANGE		WEIGHT
Software Criticality	Very Low	Very High	Strong

Driver Slider Bars

Low   High

Evaluating Drivers

Mapping Drivers to Strategies [1]

Mapping Drivers to Strategies 2

KEY

| Weak or No Linkage |
| **M** Medium Linkage |
| **S** Strong Linkage |

STRATEGY DRIVERS	Pgrm			Business				Risk Management	Test and Evaluation	Product		
	Milestone Decision Points	Acquisition Phases	Acquisition Approach	Competition	Solicitation Type	Source Selection	Contract Approach	Risk Management	Test and Evaluation	Training	Installation	Source of support
Software Criticality	S	S	S	S	S	S	S		S	S	S	M
Acquisition Environment												
Policies and Mandates	S	S	S	S	S	S	S		S	S	S	S
Supplier Availability		S	S	S	S	S	S			M	M	S
Programmatic Category Drivers												
Mission Needs and Scope	S	S	S	S	S	S	S	M	S	S	S	S
Funding												
Funding Constraints	S	S	S	S	S	S	S	M	S	S	S	S
Funding Profile	S	S	S	S		M	S		M	M	M	S
Schedule												
Schedule Constraints	S	S	S	S	S	S	S	M	S	S	S	S
Urgency	S	S	S	S	S	S	S	M	S	S	S	S

Evaluating Strategic Choices
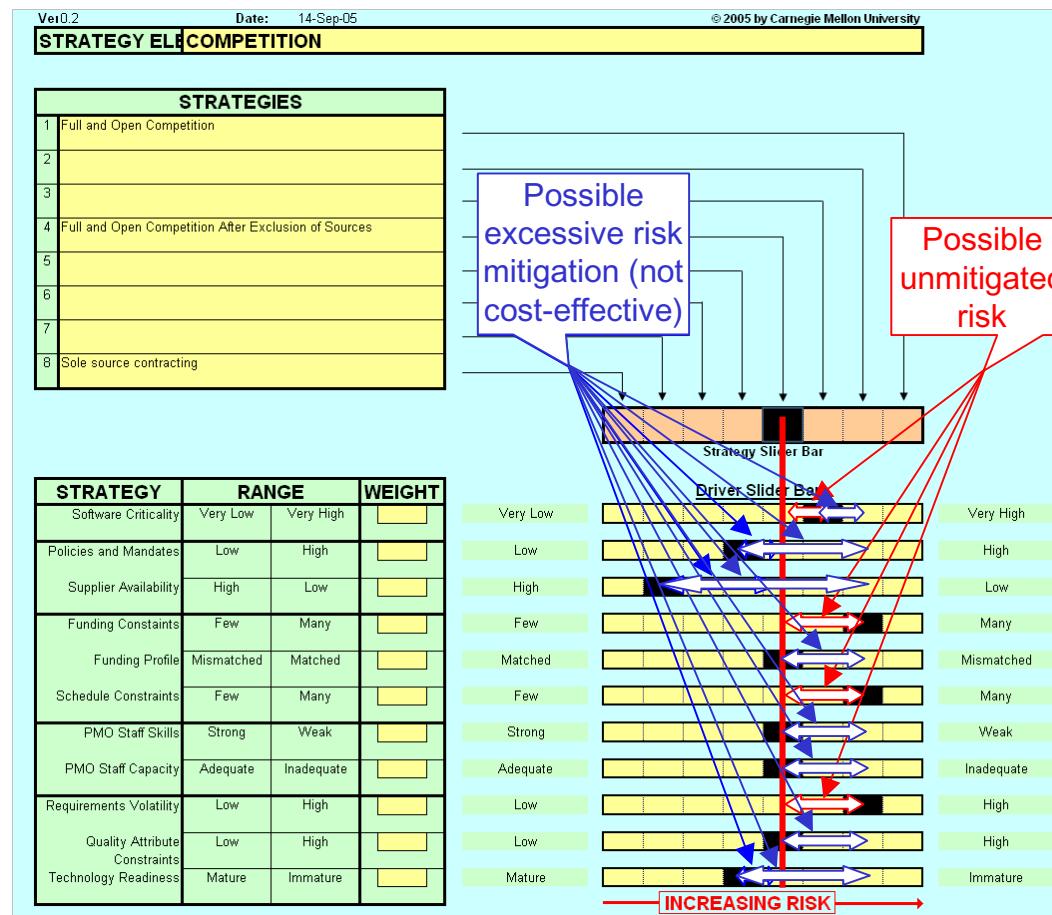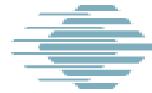
Research Status

Original effort (funded by US Army) is complete

- Technique piloted with US Army GCCS program.
- Technical Report ("*Techniques for Developing an Acquisition Strategy by Profiling Software Risks*") available on SEI web site (http://www.sei.cmu.edu) Dec 05
- Spreadsheet tool available on SEI web site Dec-05

Future efforts

- Refine the process via "use and learn"
- Expand technical report to include guidance for more strategy elements.

Conclusion

Questions ?

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